

CLAIMS

I claim:

- 1 1. A turbine vane, comprising:
2 a generally elongated airfoil having a leading edge, a trailing edge, a first
3 endwall at a first end, a second endwall at a second end generally opposite the first
4 end, at least one cavity forming a cooling system in the vane, and at least one outer
5 wall defining the at least one cavity forming at least a portion of the cooling system;
6 wherein the cooling system comprises at least one vortex forming chamber in
7 the outer wall of the vane that is located proximate to an intersection between the
8 generally elongated airfoil and the first endwall for cooling the intersection between
9 the generally elongated airfoil and the first endwall.
- 1 2. The turbine vane of claim 1, wherein the at least one vortex forming
2 chamber comprises at least one tube positioned around the perimeter of the
3 generally elongated airfoil and proximate to the intersection between the generally
4 elongated airfoil and the first endwall.
- 1 3. The turbine vane of claim 2, wherein the at least one vortex forming
2 chamber comprises at least one tube positioned around the perimeter of the
3 generally elongated airfoil and proximate to the intersection between the generally
4 elongated airfoil and the second endwall.
- 1 4. The turbine vane of claim 2, wherein the at least one tube has a
2 generally cylindrical cross-section.
- 1 5. The turbine vane of claim 1, further comprising at least one cooling
2 injection hole providing at least one cooling fluid supply pathway between the at least
3 one cavity forming at least a portion of the cooling system and the at least one vortex
4 forming chamber for enabling cooling fluids to enter the vortex forming chamber.

1 6. The turbine vane of claim 5, wherein the at least one cooling injection
2 hole directs cooling fluids into the vortex forming chamber in a direction offset from a
3 longitudinal axis of the vortex forming chamber.

1 7. The turbine vane of claim 6, wherein the at least one cooling injection
2 hole comprises a plurality of cooling injection holes around a perimeter of the
3 generally elongated airfoil.

1 8. The turbine vane of claim 1, further comprising at least one film cooling
2 hole extending from the at least one vortex forming chamber to an outer surface of
3 the generally elongated airfoil.

1 9. The turbine vane of claim 8, wherein an outlet of the at least one film
2 cooling hole is positioned in the endwall proximate to the intersection between the
3 generally elongated airfoil and the endwall.

1 10. A turbine vane, comprising:
2 a generally elongated airfoil having a leading edge, a trailing edge, a first
3 endwall at a first end, a second endwall at a second end generally opposite the first
4 end, and an internal cooling system formed from at least one cavity defined in part
5 by at least one outer wall;
6 wherein the cooling system comprises at least one tubular vortex forming
7 chamber in the outer wall of the vane that is located proximate to a fillet positioned at
8 an intersection between the generally elongated airfoil and the first endwall for
9 cooling the intersection between the generally elongated airfoil and the first endwall.

1 11. The turbine vane of claim 10, wherein the at least one vortex forming
2 chamber comprises at least one tube positioned around the perimeter of the
3 generally elongated airfoil and proximate to the fillet at the intersection between the
4 generally elongated airfoil and the first endwall.

1 12. The turbine vane of claim 11, wherein the at least one vortex forming
2 chamber comprises at least one tube positioned around the perimeter of the
3 generally elongated airfoil and proximate to the fillet at the intersection between the
4 generally elongated airfoil and the second endwall.

1 13. The turbine vane of claim 11, wherein the at least one tube has a
2 generally cylindrical cross-section.

1 14. The turbine vane of claim 10, further comprising at least one cooling
2 injection hole providing at least one cooling fluid supply pathway between the at least
3 one cavity forming at least a portion of the cooling system and the at least one vortex
4 forming chamber for enabling cooling fluids to enter the vortex forming chamber.

1 15. The turbine vane of claim 14, wherein the at least one cooling injection
2 hole directs cooling fluids into the vortex forming chamber in a direction offset from a
3 longitudinal axis of the vortex forming chamber.

1 16. The turbine vane of claim 15, wherein the at least one cooling injection
2 hole comprises a plurality of cooling injection holes around a perimeter of the
3 generally elongated airfoil.

1 17. The turbine vane of claim 10, further comprising at least one film
2 cooling hole extending from the at least one vortex forming chamber to an outer
3 surface of the generally elongated airfoil.

1 18. The turbine vane of claim 17, wherein an outlet of the at least one film
2 cooling hole is positioned in the endwall proximate to the fillet position at the
3 intersection between the generally elongated airfoil and the endwall.